**Tractor beam built from rings of laser light**

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Stand aside, Wesley Crusher: there's a new [tractor beam](http://en.memory-alpha.org/wiki/Tractor_beam) on deck that pulls objects using nothing more than laser light. The device has already grabbed NASA's attention as it could one day prove useful on space missions.

It is well known that light can push on objects – this is the basis for using [solar sails](http://www.newscientist.com/article/mg20627603.800-maiden-voyage-for-first-true-space-sail.html)Movie Camera to propel a spacecraft. But getting light to pull on something is a bit trickier.

Previous laser-based tractor beams could [act like tweezers to move particles](http://www.newscientist.com/blogs/nstv/2011/12/play-microscopic-tetris-with-optical-tweezers.html), picking up the sample and putting it down a short distance away. A more recent version actually pulls on particles, but relies on [temperature variations](http://www.newscientist.com/blogs/shortsharpscience/2010/09/tiny-tractor-beams-gain-a-thir.html) in the beam, which means it cannot function in space.

In 2011, researchers in China calculated that a type of laser called a [Bessel beam](http://www.newscientist.com/article/dn20193-treklike-tractor-beam-is-possible.html), which puts out light in concentric rings, could be designed to make a particle inside the beam emit photons on the side facing away from the beam source. These photons should allow the particle to recoil towards the source. But nobody has so far managed to put the idea into practice.

David Ruffner and [David Grier](http://physics.nyu.edu/grierlab/) of New York University instead projected two Bessel beams side by side and used a lens to angle them so that they overlapped, creating a pattern of alternating bright and dark regions. Fine-tuning the beam caused photons in the bright regions to scatter toward the beam source, pushing a particle in the beam to the next bright region. The beam thus acts like a conveyer belt, constantly drawing the particle toward the source.

**Micrometre moves**

Ruffner and Grier used this set-up to move microscopic silica spheres suspended in water over distances of around 30 micrometres. This suggests that such beams could be used to move cells around in lab-on-a-chip devices that perform medical tests. The set-up can also work in air or in the vacuum of space.

This tractor beam set-up has stronger interactions with a wider range of microscopic objects than other versions, adds [David McGloin](http://www.dundee.ac.uk/elecengphysics/staff/davidmcgloin/) of the University of Dundee, UK, who was not part of the team. "A lot of other tractor-beam technologies are often quite particle-specific," he says.

The new tractor beam might be useful for [*collecting small dust or atmosphere samples from other worlds*](http://youtu.be/i96JmNcoSj4) and delivering the particles to a robot for analysis. "NASA contacted us," says Ruffner. "They were wondering, can we put this on a space probe and get dust from a comet?" It is possible, he says, but not any time soon. "This is still very much in its infancy."

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